

less from college course instruction than students with high GPAs. Therefore, it follows that they might also learn less in a short-term review. By this logic, students with the highest GPAs should have improved their performance the most by taking a coaching course. However, it is likely that the effects of coaching courses for these students were muted by a "ceiling effect." Many of them scored at a level that left little room for improvement within the confines of what the test measures. The same ceiling effect may also have reduced the score improvement of applicants from very selective colleges who took a commercial coaching course.

Although the significance tests provided evidence of performance differences between coached and uncoached examinees, the substantive importance of these differences must be evaluated by other means. The magnitude of the coaching differences cast in standard deviation units tends to be somewhat smaller than that reported in Scott and colleagues' (6) NBME study. MCAT average score differences of one-half point are equivalent to .2 to .3 standard deviation units. Scott's study reported differences on the NBME examination that were equivalent to .4 standard deviation units. Under Cohen's (15) model for classifying effect sizes, the differences reported in the present study would be described as "small."

Neither of these interpretations provides specific guidance to the student or the premedical adviser who questions whether or not a coaching course is really worthwhile. For them, the ultimate criterion for assessing the effect of coaching is its impact on medical school acceptance. In many cases, it is difficult if not impossible to establish whether taking a review course really made the difference in a student's being accepted. MCAT

scores are only one criterion medical schools use to evaluate applicants and tend to be less important than either college grades or the interview (16). By relating MCAT scores to acceptance decisions, the question can be addressed in general probability terms: To what degree do MCAT score differences of the magnitude found between coached and uncoached examinees alter a student's chances of being accepted?

Figure 2 presents data bearing on this question. The percentage of accepted applicants in 1982-83 was plotted against average MCAT scores in the Science Knowledge and Science Problems subtests. The double weighting of Science Problems subtest items in this averaging should again be noted. The acceptance figures ranged from 4 percent of the students with an MCAT score of 3 to 97 percent for an MCAT score of 14. The plot produced an S-shaped curve showing that differences in MCAT scores in the middle ranges of the scale more critically affected admissions decisions than those same differences at either extreme of the MCAT scoring scale. A half-point difference in the average scores on the Science Knowledge and Science Problems subtests occurring in the 7.5 to 8.0 range resulted in a difference of 8 percentage points in the probability of being accepted (41 percent compared with 33 percent). A change of this magnitude had less impact if it occurred for an examinee at the lower or the upper end of the scale. The curve tends to overestimate the importance of MCAT score differences alone. Correlation between undergraduate GPA and MCAT scores causes the curve to rise more steeply than it would based on MCAT score differences alone. The higher acceptance rates at higher MCAT score levels reflects in part the higher grades of students at these levels. There-

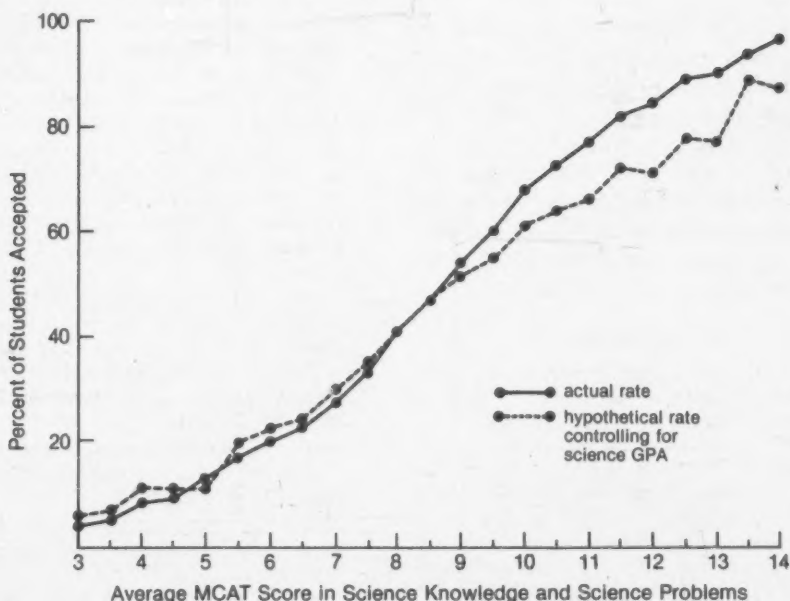


FIGURE 2

Acceptance rates of 36,023 medical school applicants for 1982-83, by average scores on the Science Knowledge and Science Problems subtests of the Medical School Admission Test (MCAT) (for explanation of controlling science GPA, see text).

fore, for comparison, Figure 2 also shows a hypothetical curve demonstrating changes in acceptance rates by MCAT score levels with science GPA controlled; that is, acceptance rates within each category of GPA were averaged to produce an acceptance rate for each score level. The hypothetical curve exhibits a more moderate slope. Differences in acceptance rates at critical points in the middle range between MCAT score levels a half-point apart did not exceed 5 percentage points and were generally less.

Conclusion

The two studies reported here suggest that commercial coaching courses do have an effect on performance on the MCAT. However, this effect was limited to certain MCAT subtests, was small, and was likely

due to the science review component of MCAT coaching programs. It would be desirable for these results and their interpretation to be validated by smaller scale studies that gather more detailed data on the amount of time coached and uncoached examinees spend on test preparation, that describe more specifically the nature of the coaching that students receive, and that permit a random selection of students and a random assignment to programs. Unfortunately, this last feature would be exceedingly difficult to implement.

The studies reported in this paper address only some of the questions which arise from the coaching issue (17). Further research is needed to assess more clearly the implications of coaching for the predictive validity of the MCAT. In-

formation is needed on the extent to which the time that college students spend in commercial coaching courses and individual preparation for the MCAT detracts from their pursuit of a broad undergraduate education. Clearly the issues surrounding coaching cannot be resolved by data-oriented studies alone but well-designed studies should provide data for an informed discussion of the issues.

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Race and Socioeconomic Status In Medical School Choice and Indebtedness

*Gloria J. Bazzoli, Ph.D., E. Kathleen Adams, Ph.D.,
and Sara L. Thran*

Abstract—Current and proposed cutbacks in student financial assistance may significantly reduce the likelihood that low-income and minority individuals will be able to pursue a medical career. In order to estimate the magnitude of the potential effects of these cutbacks, the authors of the study reported here examined the effectiveness of the federal health manpower programs of the 1960s and 1970s in increasing access to medical education. The results suggest that regardless of race or ethnic background individuals from families with small resources were able to enter even the most expensive medical schools without incurring substantially greater debt than individuals with more family resources. In addition, the debt burden of the minority physicians examined was not very different from that of nonminority physicians. Thus, the health manpower programs appear to have been very effective, and their elimination should have a larger adverse effect on low-income individuals than on high-income persons.

Health manpower programs during the late 1960s and the 1970s made it possible for low-income and minority individuals to afford a medical education. These programs, such as the Health Professions Student Loan Program and the Scholarship Program for First-Year Students of Exceptional Financial Need, sharply reduced the costs of an individual's education. Studies have found that, as a result,

some progress was made in increasing access to medical training for minority and poor individuals (1-3). Recently, however, substantial tuition increases occurred concurrently with reductions in the level of state and federal educational support, and early evidence suggests that enrollment in predominantly black medical schools have decreased (1, 3).

Since access to medical education concerns policymakers and the medical profession, it is important to determine the extent to which current and proposed cutbacks in student financial assistance will reduce the likelihood that low-income and minority individuals will be able to pursue a medical career. One way to address this issue is to examine the effectiveness of federal health manpower programs during the 1960s and 1970s. If

Dr. Bazzoli is a partner, Health Policy Research Group, Chicago, Illinois; Dr. Adams is senior economist at the Center for Health Services Research, University of Colorado Health Sciences Center, Denver, Colorado; and Ms. Thran is a program administrator at the Center for Health Policy Research, American Medical Association, Chicago. This study was completed while Dr. Bazzoli and Dr. Adams were research economists at the Center for Health Policy Research, American Medical Association.

these programs were effective, their elimination will have a large detrimental effect on access to medical training. The authors of the study presented here report the results of an examination of the medical school education and indebtedness of medical residents in 1983. In particular, two questions were examined: What medical schools did minority individuals and those with limited resources attend? How much debt did these individuals incur?

A number of earlier studies and reports examined data relevant to these questions but not at the level of detail of this study. In particular, prior work on minority physicians pertained to patterns of enrollment and indebtedness across racial groups (1, 3-6). The authors of the present study, however, examined not only differences across racial lines but also differences by race while controlling, at least in part, for family socioeconomic status.

Method

Data used in this analysis came from the 1983 Survey of Resident Physicians conducted by the American Medical Association (AMA) (7). The survey was designed to collect socioeconomic data from a representative sample of resident physicians in all years of training. Questionnaires were mailed to approximately 14,000 residents in 1983, and completed surveys were returned by 5,887 (45 percent). The authors of the present study examined the responses of those residents who had graduated from U.S. and Puerto Rican medical schools.

Questions on educational background and personal characteristics appeared in the AMA survey, and the residents were asked about the amount of debt they accumulated during their premedical and medical education. In addition, they were asked to designate their race or ethnic background as Asian/Pacific islander, black, Hispanic, white, or other. The au-

thors of the present study grouped together those residents who described themselves as black or of Hispanic background and referred to this group as minority residents. Residents who reported their race as white were defined to be nonminority residents. The sample used for the present study consisted of 254 minority and 4,164 nonminority residents who had graduated from U.S. and Puerto Rican medical schools primarily from 1976 through 1982. Thus, a total of 1,469 residents who graduated from Canadian or foreign medical schools or who reported their race as Asian/Pacific islander or other were excluded.

In order to examine fully the influence of past health manpower programs, the authors needed a control group for family socioeconomic status, since individuals with limited resources have a greater need for these programs. The 1983 AMA survey of residents contained information that could be used to determine the family socioeconomic status of the resident—the educational attainment of the resident's mother and father. The minority and nonminority residents were thus divided into two groups according to the educational attainment levels of their parents: (a) residents whose mothers and fathers both had high school education or less and (b) residents whose mother or father had at least some college training. Residents in the former group were assumed, on average, to come from a low socioeconomic strata (low SES), whereas those in the latter group were assumed to come from a higher socioeconomic strata (high SES). Among the residents examined, 45.1 percent of the black and Hispanic residents had families in the low SES group, and 22.9 percent of the nonminority residents had families in the low SES group.

The medical schools attended by residents in the AMA survey were classified

by type in order to examine the influence that race and parents' education had on medical school choice. Three types of medical schools were distinguished: public U.S. and Puerto Rican medical schools; private U.S. and Puerto Rican medical schools, excluding the three predominantly black medical schools (that is, Howard University College of Medicine, Washington, D.C.; Meharry Medical College School of Medicine, Nashville, Tennessee; and Morehouse School of Medicine, Atlanta, Georgia); and private, predominantly minority schools, consisting of Howard, Meharry and Morehouse.

Results and Discussion

Table 1 reports the distribution of the residents by parental education and by the type of medical school from which

the residents had graduated. Overall, the distribution of minority residents and that of nonminority residents were significantly different. This difference was due to the large proportion of black residents within the minority category (around 23 percent) who graduated from the predominantly black medical schools. This percentage was comparable with those presented in Sullivan (1) and in an unpublished study by Dr. Ruth Hanft for the Association of Minority Health Professions Schools (AMHPS) in 1983.

The distribution of minority and nonminority residents across types of medical schools was fairly similar for both SES categories, and statistical tests confirmed that these distributions were not statistically different. Thus, individuals from families with low SES attended the rela-

TABLE 1
Percentages of 254 Minority and 4,164 Nonminority Resident Physicians Responding to 1983 Survey, by Type of Medical School Attended and by Parents' Education

Race/Schools	Total	Parents' Education†	
		High School or Less	Some College
Minority*			
Public	55.4	58.7	52.6
Private—nonminority‡	32.6	32.1	33.1
Private—minority§	12.0	9.2	14.3
'Top ten'**	13.6	13.0	14.3
Nonminority*			
Public	59.8	60.5	59.6
Private—nonminority‡	40.2	39.5	40.4
Private—minority§	††	0.0	††
'Top ten'**	8.1	6.1	8.8

* Minority residents were those who defined themselves as blacks and Hispanic persons. Nonminority residents were those who defined themselves as white.

† The authors used parents' education as the measure of the socioeconomic status of resident's family.

‡ Private U.S. medical schools except the predominantly black medical schools of Howard University College of Medicine, Meharry Medical College School of Medicine, and Morehouse School of Medicine.

§ Private, predominantly black U.S. medical schools: Howard University College of Medicine, Meharry Medical College School of Medicine, and Morehouse School of Medicine.

** 'Top ten' medical schools as rated by Cole and Lipton (8).

†† Less than 0.5 percent.

tively more expensive private medical schools in similar proportions to their racial and ethnic counterparts with high SES.

Table 1 reports another indicator of access to medical education: the proportion of residents who attended the 10 medical schools with the highest reputations as measured by Cole and Lipton (8). Several implications can be drawn from these data. First, low family socioeconomic status of minority residents has not been a deterrent to attendance at these highly rated schools. The proportion of minority residents who had graduated from the "top 10" schools and whose families had a low SES (13.0 percent) was not significantly different from that of minority residents with a high SES (14.3 percent) who had attended the 10 schools. However, the same was not true for nonminority residents. Significantly fewer nonminority residents who had a low SES graduated from the top rated medical schools compared with those with high SES (6.1 versus 8.8 percent).

Another finding shown in Table 1 is that a larger proportion of minority residents graduated from the 10 top-rated medical schools than nonminority residents, almost 14 percent compared with 8 percent. One factor in particular may help explain this result. Minority individuals may prefer urban settings for their medical education, because more frequently than nonminority individuals they have been raised in urban areas. Nine of the 10 top-rated medical schools are located in metropolitan areas.

Though it appears that low socioeconomic status has not been a major barrier to the type of medical school attended, it is important to consider the cost that this training imposes on these individuals. As noted previously, earlier studies have suggested that minority individuals and those

with few family resources accumulate substantially more debt. In particular, Flamer and colleagues (9) suggested that minority medical students will accumulate twice as much debt as nonminority students over the course of their medical education.

Table 2 presents data on educational debt accumulated during medical school by the resident's personal background and type of medical school attended. The latter distinction was examined because the costs of medical education vary considerably between public and private schools. Within each category of medical school, there were no significant differences in either the percentage of residents with debt or the mean level of debt when minority residents as a group were compared with nonminority residents. Thus, the minority residents overall did not appear to have a significantly larger debt burden than nonminority residents who had graduated from the same kind of school.

Within the minority and nonminority subgroups, however, were significant differences in indebtedness. In particular, those residents who had graduated from public medical schools and who had a low SES more frequently had medical education debt when compared with those with high SES, regardless of race or ethnic group. In addition, nonminority residents who had graduated from the private, nonminority medical schools and who had a low SES more frequently had debt than nonminority residents with high SES from these schools. Finally, the average debt of nonminority residents from the private, nonminority schools with low SES was significantly greater than the average debt of nonminority residents from these schools with high SES.

The results for the 10 top-rated medical schools were, however, very different

TABLE 2
Percentage of 254 Minority and 4,164 Nonminority Resident Physicians with Medical Education Debt and Mean Debt (in Dollars), by Type of Medical School Attended and Parents' Education, 1983*

Type of Medical School	Minority Residents						Nonminority Residents					
	Total		Parents' Education				Total		Parents' Education			
			High School or Less		Some College				High School or Less		Some College	
	Percent Debt	Mean Debt†	Percent Debt	Mean Debt†	Percent Debt	Mean Debt†	Percent Debt	Mean Debt†	Percent Debt	Mean Debt†	Percent Debt	Mean Debt†
Public	77.6	17,100	89.0	18,000	67.1	16,000	72.4	16,000	82.5	17,000	69.3	15,700
Private—non- minority	75.3	20,400	82.9	22,300	70.5	18,500	70.6	20,400	82.3	21,600	67.2	19,900
Private—mi- nority	79.3	16,100	80.0	22,000	78.9	13,000	‡	‡	§	§	‡	‡
'Top ten'	77.1	17,900	93.3	15,900	65.0	20,000	66.8	18,000	71.2	19,400	65.7	17,700

* For explanations applicable to table, see footnotes to Table 1.

† Mean debt in dollars computed only with those residents who incurred debt.

‡ Only two residents are in this category. This sample size is too small to compute a statistically reliable mean.

§ No residents in this category.

from the results of the other categories of schools. First, there was very little difference in the percentage of nonminority residents with debt across SES categories. Second, although minority residents with low SES appeared more likely to have taken educational loans, they needed to borrow less than minority residents who came from high SES families. The small cell sizes in the analysis preclude an estimate of the significance of these differences, but the differences are suggestive in light of the results in Table 1. The top 10 schools may have very effective support programs for minority and low-income individuals.

The data reported in Table 2 demonstrate that the government assistance programs to assist needy individuals in financing medical education have been successful at holding down an individual's education cost in some types of medical schools. Thus, it appears that access to even the more expensive medical schools did not result in excessively higher debt burdens for students with limited resources.

Table 3 reports debt accumulated during medical school by source; that is, loans under the Guaranteed Student Loan (GSL) Program, National Direct Student Loan (NDSL) Program, Health Professions Student Loan (HPSL) Program, Health Education Assistance Loan (HEAL) Program, and "other" sources. The sources of medical education debt varied primarily by SES category. Within each racial and ethnic subgroup, residents from low SES families had significantly more NDSL and HPSL debt. This variation in source of debt is consistent with the findings of Flamer and colleagues (9) and with expectations, since national direct student loans and health professions student loans can be obtained only if financial need is demonstrated (10, 11). Since loans under the NDSL program have much lower rates of interest than loans under the GSL and HEAL programs, the results in Table 3 suggest that the differences in debt between residents from low SES and those from high SES families overestimate the true difference in debt burden. Medical school graduates

TABLE 3
Average Medical Education Debt (in Dollars) of 254 Minority and 4,164 Nonminority Resident Physicians, by Loan Source and Parents' Education, 1983*

Source	Minority Residents			Nonminority Residents		
	Total	Parents' Education		Total	Parents' Education	
		High School or Less	Some College		High School or Less	Some College
GSL†	7,100	7,400	6,900	8,900	9,100	8,800
NDSL‡	2,000	2,400	1,600	1,500	2,000	1,300
HPSL§	3,800	4,600	3,100	2,000	2,600	1,800
HEAL**	1,000	1,200	800	600	700	600
Other	4,000	4,100	3,800	4,800	4,400	4,900
Total	17,900	19,700	16,200	17,800	18,800	17,400

* For explanations applicable to table, see footnotes to Table 1.

† GSL = Guaranteed Student Loan Program.

‡ NDSL = National Direct Student Loan Program.

§ HPSL = Health Professions Student Loan Program.

** HEAL = Health Education Assistance Loan Program.

from families with fewer resources will tend to have lower loan repayments per dollar of debt, since more of their debt comes from the sources with lower interest rates.

When premedical education debt is added to the medical education debt that was reported in tables 2 and 3, the authors found similar results to those reported above for debt accumulated strictly during medical school. In particular, 92.9 percent of the minority residents and 88.2 percent of nonminority residents from a low SES had debt, whereas the comparable proportions for high SES residents were only 79 percent of minorities and 72.3 percent of nonminorities. In addition, residents from low SES families had a significantly higher level of total premedical and medical debt for each of the racial and ethnic groups. Minority residents as a group more frequently had debt than nonminority residents, but the mean level of total premedical and medical debt was not significantly different across the racial and ethnic groups (\$26,000 for minorities and \$25,400 for nonminorities).

These results are in sharp contrast to

those of another study that found that black medical students overall had substantially more educational debt from medical schools when compared with white students (9). The results of the present study suggest that debt varied by family resources rather than by racial and ethnic groups. In addition, differences in indebtedness by family SES were not as large as might be expected. Data from Table 3 indicate that debt from medical school of minority residents with a low SES was only 22 percent greater on average than medical school debt for minority residents from a high SES, while nonminority residents from a low SES had a medical school debt that was only 8 percent greater than nonminority residents from a high SES. Also, these differences overestimate the difference in total debt burden, since residents with limited resources more frequently have highly subsidized loans.

Conclusion

The overriding conclusion from the results is that the health manpower programs of the 1960s and 1970s were fairly

successful at making attendance at even the more expensive medical schools affordable for those with limited resources. Within racial and ethnic groups, there were no significant distributional differences in the type of medical school attended in terms of family socioeconomic status. However, this distribution varied over racial and ethnic groups mainly because of the large proportion of black residents within the minority group who attended the predominantly black medical schools. On the other hand, the extent of educational indebtedness varied primarily by family SES and not by race or ethnicity. Even though resident physicians with fewer resources had significantly more debt, the differences in debt load by SES were much smaller than anticipated. Also the differences in debt burden across the socioeconomic groups was overstated to some extent, since residents with limited resources more frequently had debts at lower interest rates.

These findings have a variety of policy implications, especially in light of actual and proposed changes in federal funding for medical education. The federal government has reduced the total amount of money for educational loan programs. Although the government has increasingly directed funding toward individuals in low SES families, the access of these families to low interest educational loans has declined. The results of the study reported here indicate that these changes would have a large impact on access to medical education. The federal loan programs for health education appear to have been very effective at holding down an individual's cost of medical training. Because of the reductions in these programs, then, the cost of this training may increase dramatically for individuals from low income families. It seems likely that many individuals from these families would no

longer be able to afford a medical education under these circumstances.

Increased access to medical education and to educational assistance for minority and low-income individuals has two major benefits for society. In the first place, increased access fosters an environment in which all individuals, regardless of race, ethnicity, or family income, can achieve their fullest potential. Second, the influx of minority and low-income individuals into medicine has helped relieve the maldistribution of physicians in certain areas of the country. Minority and low-income individuals more frequently select primary care specialties and practice in underserved locations (12-14). Policymakers must carefully weigh these benefits as they consider further changes in the federal funding of loan programs for the health professions.

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Evaluation of Ambulatory Care Training By Graduates of Internal Medicine Residencies

*Lawrence S. Linn, Ph.D., Robert H. Brook, M.D., Sc.D.,
Virginia A. Clark, Ph.D., Arlene Fink, Ph.D.,
and Jacqueline Kosecoff, Ph.D.*

Abstract—In 1984, 154 physicians who had completed residencies in internal medicine at 15 major teaching hospitals in 1982 evaluated their residency training in ambulatory care. A majority of the physicians would have liked more experience in practical areas related to career planning and office management, more input from subspecialties such as orthopedics and dermatology, greater knowledge about the management of psychosocial problems, and more information about exercise and nutrition. Although many physicians also wanted more time devoted to several other topics, less than 20 percent recommended spending less time on 26 of the 27 topics being evaluated. Since these recommendations are similar to those reported in evaluation studies published over the past 25 years, it appears that training programs in internal medicine have not been successful in restructuring their curricula to meet many of the needs of practicing physicians.

During the past 25 years a number of studies of former residents' evaluations of their postgraduate training in internal medicine and pediatrics have been published. Most have been studies of the graduates of a single training program (1-5), but some have studied graduates on a regional or statewide basis (6-7). Evaluations of individual residency programs have been useful in that the investigators often examined specific components of a program, thereby providing detailed in-

formation to training program directors. More broadly based studies tended to pay less attention to specific aspects of programs but provided more generalizable information. In spite of the size or number of the programs evaluated, published reports since the 1960s have several recurring findings: graduates want more training in subspecialty ambulatory care; more training in common ambulatory problems, particularly psychosocial problems; and more frequent interactions with faculty members.

Because of the absence of national studies of recent alumni of residency training programs and the importance of assessing the needs and opinions of practicing physicians, the authors of the present paper undertook a study of the graduates of 15

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Dr. Linn is a research sociologist in medicine and public health; Dr. Brook is a professor of medicine and public health; Dr. Clark is a professor of public health; and Dr. Fink and Dr. Kosecoff are adjunct assistant professors of medicine and public health; all are at the University of California, Los Angeles.

internal medicine programs. (The study was part of a comprehensive evaluation of the primary care group practices of departments of medicine in the 15 major teaching hospitals carried out by the authors). In 1984 all physicians who had completed internal medicine residency training in the 15 hospitals in July 1982 and who had spent an average of half a day per week in the group practice were asked to participate.

The first purpose of the study reported here was to obtain these physicians' opinions of specific aspects of their training in ambulatory care, particularly the content, skills, and rotations that should or should not have been routinely provided. Ambulatory care was the focus of this evaluation because of the increasing interest of society in keeping patients out of hospitals and because after training physicians spend the vast majority of their time providing outpatient care. However, for purposes of comparison, several inpatient rotations were also evaluated here. A second purpose was to compare levels of job satisfaction and work-related stress among these physicians two years after completion of their training with the levels expressed by internal medicine house staff members in the same hospital residency training programs in 1984. Although job satisfaction and work-related stress are frequently discussed in relation to medical training and practice, there have been relatively few empirical studies of either (8-15). Such information, together with physicians' opinions on the kinds of training that would have been more or less useful to them, should help directors of residency training programs make more knowledgeable decisions about the direction their ambulatory care programs should take or problems that need to be resolved.

Methods

Physicians who had spent an average of one half day per week in the primary care group practice and had completed residency training in internal medicine in July 1982 at 15 hospitals (a total of 234) were asked to complete self-administered questionnaires during April and May of 1984. Completed questionnaires were returned by 154 physicians (66 percent). Twenty-seven percent of the responding physicians were women, 71 percent were married, 41 percent had children, and 7 percent were of black, Hispanic, or Asian background.

The 15 teaching hospitals in the study were: Albany Medical Center Hospital, Albany, New York; Georgetown University Hospital, Washington, D.C.; the Johns Hopkins Hospital, Baltimore, Maryland; Medical College of Virginia Hospital, Richmond; Mount Sinai Medical Center, New York, New York; New England Medical Center Hospital, Boston, Massachusetts; North Carolina Memorial Hospital, Chapel Hill; St. Louis University Medical Center, St. Louis, Missouri; University of California, Los Angeles, Medical Center; University of California, San Francisco Ambulatory Care Center; University of Colorado Health Sciences Center, Denver; University of Medicine and Dentistry of New Jersey-University Hospital, Newark; Vanderbilt University Medical Center, Nashville, Tennessee; West Virginia University Medical Center, Morgantown; and Yale-New Haven Hospital, New Haven, Connecticut. Based upon data from the '81-82 *Directory of Residency Training Programs* (16) and the 1981 *American Hospital Association Guide* (17), these hospitals did not differ significantly from other teaching hospitals in terms of total

number of beds, average occupancy rate, annual number of admissions, annual live births, number of residency positions, annual number of admissions to the medical service, and number of outpatient visits to the internal medicine practice.

Six specific dimensions of job satisfaction were measured: (a) the status and prestige associated with work in ambulatory care (4 items); (b) the degree of perceived control in making administrative and organizational decisions (5 items); (c) social and interpersonal relations with other health workers (2 items); (d) the adequacy of available facilities and resources (5 items); (e) the diversity of the patient population served; and (f) the educational climate (2 items). An eight-item global satisfaction scale, which evaluated many specific dimensions of work, was also employed. Satisfaction scores were calculated for each of these seven scales by summing the responses to the individual items and then dividing this sum by the number of items in the scale. The scales met conventional standards of internal consistency reliability ($\alpha \geq .5$), and higher scores indicated greater satisfaction.

Two measures of work-related stress and conflict were used. The stress scale consisted of 10 problems rated on a 5-point continuum from never occurring (low scores) to occurring very often (high score). These problems included keeping up with the literature, meeting patients' needs and demands, solidifying goals for future education, mastering the knowledge base of medicine, being clinically competent, getting along with others, maintaining self-confidence, making good clinical judgments, making decisions about where to practice, and finding time to spend with friends and family. The conflict scale consisted of seven items

measuring the degree of conflict between work and personal aspects of life, evaluated on the same 5-point continuum. Both scales met conventional standards of reliability, and higher scores indicated greater stress or conflict.*

The sample of residency graduate physicians was also surveyed on 27 content or skills areas in ambulatory care training and was asked whether more training time should have been spent in each activity, the time devoted was about right, less time should have been spent, or no time at all should have been spent. In addition, the physicians were asked to evaluate the nine clinical rotations in their residency training and eight innovations designed to increase the educational value of the residency program in terms of the degree to which the innovation would have added to or detracted from their overall education. The physicians also indicated the extent to which their experience in the internal medicine group practice during residency influenced the kind of medical career they planned to pursue. They were also asked how they divided their time among various work activities in their practices, to describe their practice setting, and to indicate how many hours they worked in an average week.

All internal medicine house staff members spending one-half day or more per week in the group practice in the 15 teaching hospitals in 1982 (750 residents) and in 1984 (785 residents) at the time completed questionnaires measuring job satisfaction, work-related stress and conflict, and attitudes toward the eight educational innovations in ambulatory care training. The response rate of the 1982 sample was

* The specific items and frequency distributions are available from the authors.

88 percent ($n = 660$), and the response rate of the 1984 sample was 80 percent ($n = 628$). Data pertaining to these residents were compared with the responses of the 154 residency graduate physicians.

Results

At the time of the survey in 1984, almost half of the 154 responding residency graduate physicians were in subspecialty training (45 percent), and an additional 14 percent were involved in research fellowships. Nine percent were in private practice, 8 percent were working in emergency rooms, 11 percent were in full-time salaried positions in nonacademic settings (such as health maintenance organizations and clinics), 4 percent were full-time faculty members in teaching hospitals, and 8 percent were in other positions.

The physicians reported that their most time-consuming activity was direct patient care, estimated to take 52 percent of their time. Research was the next most time-consuming (21 percent), followed by reading (10 percent), house staff supervision (9 percent), administration (4 percent), and classroom teaching (3 percent). The estimated number of hours worked averaged 59 per week.

Table 1 lists the physicians' opinions on the content areas and skills they thought should be included in internal medicine residency training. A majority indicated that the following eight content areas or skills deserved more attention during their residency training: office orthopedics, office dermatology, office management, sexual dysfunction, nutritional counseling, management of depression, career counseling, and developing exercise programs. The physicians were extremely reluctant to recommend that less or no time be spent on training pertaining to the skills and activities. However, some physicians recommended re-

ducing or eliminating training in use of the problem-oriented medical record, family or behavior therapy, and communication skills.

Table 2 shows the graduate physicians' evaluations of the clinical rotations during their residency. Eighty percent or more indicated that the time allocated to inpatient wards, the intensive care unit, the critical care unit, and the emergency room had been about right. However, 34 percent felt that more time should have been spent in subspecialty clinics, while others thought that less or no time should have been spent on student health (44 percent), on family planning (30 percent), and in out-of-hospital rotations (20 percent). Although 72 percent felt that time spent in the general internal medicine clinic was about right, 18 percent favored more time, and 11 percent recommended less time.

Table 3 lists the graduate physicians' evaluations of the eight proposed educational innovations in internal medicine training. The most favorably endorsed innovations were to increase the number and availability of attending physicians, (70 percent), of subspecialists (68 percent), and, to a lesser extent, of social workers, pharmacists, and nutritionists (64 percent). There was less consensus that increasing the amount of appointment time spent with each patient and increasing exposure to psychosocial and health maintenance issues would have been helpful. The physicians were also divided in their opinion regarding increasing the availability of nurse practitioners, increasing the amount of time spent in clinic, or increasing their case load of patients.

Table 3 also includes the questionnaire responses of the 628 responding residents who were in the same 15 residency programs in 1984. Generally, the residents

TABLE 1
Percentages of 154 Physicians Who Completed Internal Medicine Residencies
in 1982 Rating the Amount of Time Spent on 27 Ambulatory Care Activities
During Residency Training, 1984

Content Areas and Skills	More Time Needed	Time About Right	Less Time Needed	No Time Needed
Office orthopedics	78	17	0	5
Office dermatology	72	25	2	1
Office management	71	24	1	4
Sexual dysfunction	55	43	1	1
Nutritional monitoring and counseling	53	41	3	3
Career counseling	57	35	3	5
Managing depression	50	43	5	2
Pelvic examination	41	58	2	0
Managing anxiety	44	52	3	1
Cost containment	44	51	3	2
Developing exercise programs	55	35	3	7
Use of community resources	44	50	4	2
Eating disorders	43	51	4	2
Sensitivity and specificity of tests	33	61	5	1
Monitoring quality of care	35	56	7	1
Physician impairment and burnout	43	45	4	9
Drug abuse	27	66	6	1
Dealing with the suicidal patient	32	59	7	2
Suturing	37	52	4	7
Use of paraprofessionals	29	61	7	3
Brief psychotherapy	38	46	7	9
Alcoholism	20	69	11	0
Relaxation training	42	37	8	13
Communication skills	25	57	10	8
Behavior therapies	30	49	11	11
Family therapy	26	55	9	11
Use of problem-oriented record	5	68	25	3

and the graduate physicians held similar opinions about the proposed educational innovations, although some differences emerged. A greater percentage of the graduate physicians felt that increasing the number of patients seen would have been helpful (30 percent as opposed to 10 percent). On the other hand, a greater percentage of the residents felt that increasing the amount of appointment time spent with each patient would have been

helpful (67 percent as opposed to 44 percent).

Table 4 shows the physicians' mean scores on the job satisfaction, work stress, and conflict scales and the comparable scores for the 1984 residents. Generally, the graduate physicians were satisfied with most dimensions of their work. The mean score on only one job satisfaction dimension was below the 3.0 midpoint—satisfaction with participation in making

TABLE 2
Percentages of 154 Physicians Who Completed Internal Medicine Residencies in 1982 Rating the Amount of Time Spent in Nine Clinical Rotations During Residency Training, 1984

Rotation	More Time Needed	Time About Right	Less Time Needed	No Time Needed
Inpatient medical wards	5	85	10	0
Intensive care unit	6	86	7	0
Critical care unit	4	88	8	0
Emergency room	15	80	6	0
Subspecialty clinics	34	58	7	1
General internal medicine clinic	18	72	11	0
Student health	17	40	11	33
Family planning	32	38	7	23
Out-of-hospital rotations	28	52	7	13

TABLE 3
Percentages of 154 Physicians Who Completed Internal Medicine Residencies in 1982 and Percentages of 628 Internal Medicine Residents in the Same Residency Programs in 1984 Who Approved Eight Innovations in Ambulatory Care Training, 1984*

Innovation	Physicians	Residents†
Increase no. of patients	30	10
Increase no. of nurse practitioners	34	52
Increase no. of social workers, pharmacists, and nutritionists	64	71
Increase no. of subspecialists teaching in the training program	68	77
Increase clinic time	43	34
Increase contact with attending physicians	70	73
Increase appointment time spent with each patient	44	67
Increase exposure to psychosocial and/or health maintenance issues	48	62

* Respondents stated that the innovations would add somewhat or greatly to ambulatory care training.

† Sample was drawn from house staff members who spent an average of one-half day per week or more in the ambulatory group practice in each training site.

organizational and administrative decisions. Except for social and interpersonal relations, the graduate physicians were more satisfied on each dimension of work than were the residents. The physicians also indicated experiencing less job-related stress and conflict.

Because a vast majority of the graduate physicians in the sample had participated in the 1982 evaluation as senior residents, it was possible to compare their reports

of work satisfaction, job stress, and conflict in 1982 with their responses in 1984. Table 5 shows mean scale scores for the 130 physicians who participated in both evaluations and indicates that their satisfaction increased significantly on most dimensions of work. Table 4 has shown that stress and conflict scores were lower among the graduate physicians than the 1984 residents. Table 5 shows that the physicians felt a significant reduction in

TABLE 4

Mean Scores of 154 Physicians Who Completed Internal Medicine Residencies in 1982 and Mean Scores of 628 Residents in the Same Residency Training Programs in 1984 on Measures of Job Satisfaction, Job-Related Stress, and Conflict Between Work and Personal Life, 1984*

Measures	Physicians	Residents†
Job satisfaction		
Status and prestige of ambulatory care work	3.42	2.83
Perceived control of administration and organization	2.97	2.49
Social and interpersonal relations with other health workers	3.29	3.30
Adequacy of facilities and resources	3.51	3.44
Diversity of patient population	3.53	3.33
Educational climate	3.57	2.78
Global satisfaction‡	3.13	3.01
Work-related stress	2.93	3.26
Conflict between work and personal life	2.67	2.78

* Higher scores = higher satisfaction, stress, or conflict. The number of items varied from scale to scale, but all were rated on a 5-point Likert scale.

† Sample was drawn from house staff members who spent an average of one-half day per week or more in ambulatory group practice in each training site.

‡ This scale included satisfaction items on relationships with other physicians and health workers, adequacy of available resources, educational climate, diversity of patient population, the appointment system, and salary.

TABLE 5

Mean Scores on Job Satisfaction, Job-Related Stress, and Conflict Scales of 130 Physicians* Recorded When They Were Senior Residents (in 1982) and Two Years After Residency Graduation (in 1984)‡

Dimension	1982	1984
Job satisfaction		
Status and prestige of ambulatory care work	2.98	3.42‡
Perceived control of administration and organization	2.71	2.95‡
Social and interpersonal relations with other health workers	3.36	3.30
Adequacy of facilities and resources	3.28	3.52‡
Diversity of patient population	3.31	3.54‡
Educational climate	3.00	3.38‡
Global satisfaction§	3.10	3.13
Work-related stress	3.36	2.95‡
Conflict between work and personal life	2.68	2.66

* The difference between the 154 graduate physicians reported elsewhere in this study and the 130 reported here is due to nonresponse rates.

† Higher scores = higher satisfaction, stress, or conflict. The number of items varied from scale to scale, but all were rated on a 5-point Likert scale.

‡ Significant at $p = .01$ or greater.

§ This scale included satisfaction items on relationships with other physicians and health workers, adequacy of available resources, educational climate, diversity of patient population, the appointment system, and salary.

the level of work-related stress from that they reported during their last year of residency, but the level of conflict between work and personal life had not changed since their residency ended.

Although the study reported here was not designed to be a comprehensive analysis of factors associated with physician job stress, work satisfaction, or conflict, these variables can be examined in relationship to several demographic and work characteristics of the physicians.

Regarding work satisfaction measures, none was significantly correlated with the physicians' race, marital status, sex, number of children, number of hours worked per week, or percentage of time spent in administration, research, patient care, or reading. However, the physicians who had been members of special primary care training programs present in six of the training institutions were significantly more satisfied with the status and prestige associated with their work ($r = .221, p < .01$) and with the patient population they served ($r = .212, p < .01$) and had greater global job satisfaction ($r = .156, p < .05$) than physicians who received traditional internal medicine training. Also, the graduate physicians who in 1984 were spending less time teaching in the classroom or supervising house staff members (that is, those in private practice) were significantly more satisfied with the facilities and resources available to them ($r = -.219, p < .01$; $r = -.193, p < .02$) than were the physicians who spent more time in these activities.

Based upon analysis of variance, the physicians' work setting was found to be related significantly to their satisfaction with facilities and resources ($F = 2.22, p < .05$) and with their role in administrative and organizational decisions ($F = 5.18, p < .0001$). On both measures the physicians in private practice had the

highest mean scores; those working in emergency rooms had the lowest.

With regard to measures of work-related stress and conflict between work and personal life, women as compared with men had higher stress scores ($r = -.160, p < .05$) and higher conflict scores ($r = -.166, p < .05$). Physicians with children had greater conflict between work and personal life than those with none ($r = .249, p < .002$). However, those physicians who were unmarried had significantly higher stress and conflict scores ($r = -.178, p < .05$; $r = -.252, p < .01$) than the married physicians. Also, higher conflict scores were found among graduates of the special primary care training programs than those traditionally trained ($r = .171, p < .05$) and among physicians who spent a greater percentage of their time teaching in the classroom ($r = 1.58, p < .05$). Finally, higher conflict scores were associated with a greater number of hours worked per week ($r = .236, p < .01$).

Discussion

In evaluating their previous internal medicine residency training in ambulatory care, a majority of the graduate physicians indicated four rather distinct areas in which they would have liked more experience: practical areas related to office management and career planning; subspecialties such as dermatology and orthopedics; psychosocial problems such as depression and sexual dysfunction; and nutritional monitoring and counseling and developing exercise programs. In addition, 20 to 44 percent of the physicians indicated that they thought more time should be devoted to other areas. Less than 20 percent of the graduate physicians recommended spending less time on 26 of the 27 activities they were asked to evaluate. This phenomenon of wanting

more without an expressed willingness to make cuts elsewhere poses a continuing dilemma to medical educators who try to be responsive to the increasing and often changing needs of residents. In many training programs, each lunch hour is consumed by lectures, seminars, or other attempts to meet educational needs and objectives. House staff members, training directors, and hospital administrators are often unwilling to relinquish time on established ward or ambulatory rotations. Thus, more comprehensive residency training programs have been slow to develop, if at all. Clearly, the residents in internal medicine were only willing to recommend cuts in family planning, student health, or out-of-hospital rotations, areas that traditionally are not part of most internal medicine training programs.

As the data in Table 3 indicate, the physicians who completed internal medicine residencies in 1982 and the 1984 residents in the same program agreed that there was a need to increase input from subspecialists and attending physicians during residency training in ambulatory care. Increasing the input of attending physicians in the ambulatory setting was the most popular solution among the physicians for improving the educational component of the clinic experience during the residency. The recommendations made by the 1984 residents and the physicians regarding how to improve postgraduate training in internal medicine were almost identical with those reported in evaluation studies published over the past 25 years. Apparently, most training programs have not been successful in restructuring their curricula in order to meet the persistent and continuing needs of practicing physicians.

As noted in Table 4, the graduate physicians were highly satisfied with the ed-

ucational climate of their practice in ambulatory care (mean = 3.57), but house staff members expressed significantly less satisfaction (mean = 2.78). This difference in the perceptions of the degree to which ambulatory care in the teaching hospital setting is intellectually stimulating or educationally valuable poses a major dilemma for medical educators. Attending physicians often see themselves as overworked and providing continual education in the ambulatory setting through a rapid series of one-to-one interactions with house staff members. On the other hand, house staff members vary widely in their use of attending physicians and tend to view the ambulatory experience as inefficient, with considerable time being spent waiting to see an attending physician, chasing down charts, or writing in them. Ways are needed to increase the amount of time house staff members can interact with attending physicians to promote their education.

It could be argued that the findings in this paper are not representative of the populations surveyed, since 34 percent of the graduate physicians did not respond to the questionnaire. However, since the graduates of 15 internal medicine residency programs were surveyed and many of the findings were consistent with previously published reports, the results should not be dismissed. Other possible questions that could be raised about the results are whether or not the perceptions of the graduate physicians are valid and whether program directors would agree with the graduates. Although there are no available data, the present authors have observed that program directors seem as prone as residents to want to add more to their curricula without being willing to cut things out. Apparently, outpatient dermatology and orthopedics, office management, and treatment of depression are

not sufficient priorities in internal medicine training programs to justify reducing time spent by residents on inpatient wards, in intensive or critical care units, or in the emergency room. Yet, as the practice of internal medicine becomes less and less hospital-based and if program directors are going to try to meet the needs of practicing internists, dramatic changes in time allocation from inpatient to outpatient training must take place. Such changes have been undertaken modestly in general internal medicine training programs, and more dramatic changes have taken place in family medicine programs. However, program directors face several barriers in trying to alter their programs. First, serious hospital staffing problems are associated with shifting residents from inpatient to outpatient services. Second, directors may fear (justifiably or not) reducing the quality of the training experience, producing a less prepared internist, and subsequently developing the reputation of having a weak, less competitive training program. Third, serious problems are associated with asking already overextended but competent clinician-teachers to do more. Finally, some program directors have found it difficult to find competent teachers or to provide adequate training in many subspecialties.

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Students' Perceptions of Values Emphasized in Three Medical Schools

Brigitte Maheux, M.D., Ph.D., and François Béland, Ph.D.

Abstract—The purpose of the study presented here was to assess medical students' perceptions of the weight given to scientific and humanistic values in their learning environment and to determine whether students' perceptions in a given school vary according to their level of medical training and personal characteristics. The study was conducted in 1979 via a mail questionnaire sent to a sample of 713 freshmen, juniors, and graduates from three U.S. medical schools; 82.2 percent responded. The results indicated that the students' perceptions of school values varied little according to the students' personal characteristics, such as sociodemographic and educational background, interests before medical training, and expected specialty choice. However, important differences were observed in students' perceptions of values emphasized to them at different schools. Preclinical and clinical students' perceptions of the importance given to scientific values were similar. As for humanistic values, significantly lower ratings were given by clinical students than preclinical students in two of the schools.

One of the greatest challenges in medical education has been and will continue to be to achieve a proper balance among the attitudes, skills, and knowledge that medical students should possess to become good physicians.

Medical education over this century has shifted from a patient-oriented, empirical approach to a scientific approach which focuses on the biomedical aspects of the patient's disease. This change came

about with the Flexner report in 1910 (1) and contributed to improvements in many areas of medical education and patient care. However, it had the unintended effect of progressively shifting the focus of medical education from a general concern for the patient to a more specific concern over the disease.

Studies on the development of professional attitudes in medical students attest to the displacement of student interest from the patient to the more specific biological and technological aspects of disease. As their medical training progresses, students have been reported to be more cynical (2-3), less concerned about the social and emotional needs of patients (4), and less interested in caring for chronically ill patients (5). Although medical education was not necessarily perceived

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Dr. Maheux is an assistant professor in the Department of Social and Preventive Medicine, and Dr. Béland is an assistant professor in the Department of Health Administration, both at the University of Montreal Faculty of Medicine, Québec, Canada.

as the only determinant of changes in student attitudes, medical educators saw in these findings a reason for concern. A number of medical schools added to the traditional curriculum specific educational programs designed to sensitize students to the importance of focusing care on the patient rather than on the disease. The idea was to make students aware of psychosocial factors as important variables in patient care and to stress the importance of establishing a good relationship and good communication with patients.

Evaluative studies of these programs, known as comprehensive care programs, revealed mixed results. On one hand, many programs sensitized students to the notion that therapeutic outcomes depend not only on the physician's bioclinical skills but also on the physician's ability to adapt, if necessary, the therapeutic approach to the particular human and psychosocial needs of patients (6-9). On the other hand, the positive effects of the programs on the students tended to be short-lived. Indeed, when students returned to their regular clinical medical training, mostly in hospital wards, their attitudes reverted to what they were before the program (7-8). In the programs examined in these studies, the values taught were generally not supported or reinforced by the rest of the medical environment. According to Rezler (10), in order to influence student attitudes toward patient care, medical values transmitted by the educational environment must be consistent and reinforced throughout the medical education process.

The purpose of the study reported here was to assess students' perceptions of the medical values emphasized in three differently oriented medical schools. More specifically, the study focused on two

broad types of values which are not mutually exclusive: those oriented to the scientific aspects of disease and those oriented to the human aspects of patient care.¹ The authors examined three questions:

1. Are students' perceptions of the values emphasized to them similar from one school to another?
2. Do preclinical and clinical students share the same perceptions of what is emphasized to them?
3. Do students' perceptions vary according to their personal characteristics?

Methods

Students' perceptions of the values emphasized in medical schools were measured in the course of a larger survey that was conducted in 1979 by the main investigator to determine the extent to which medical education influences students' attitudes (11). The survey was conducted on a sample of freshmen, juniors, and graduates from three midwestern U.S. medical schools. These schools were selected because they differed in their approach to medical education, as demonstrated by the structural characteristics and content of the preclinical and clinical curricula of each school at the time the survey was conducted (12).

The University of Michigan (UM) Medical School was chosen to represent the research-oriented medical school. It was established in 1850 and has a long tradition of biomedical research. The school is characterized by heavy specialization in all the various disciplines in medicine. At the time of the study, the school's admission policies placed strong emphasis on students' background in the natural sciences. No requirements were imposed in the social and behavioral sciences. In the preclinical years, students were required to take a series of courses

in the basic and clinical sciences. Little instruction was given in the social and behavioral sciences. In the clinical years, students were required to take traditional clerkships in the major disciplines in medicine but none in family and community medicine. The school had an enrollment of about 950 students.

Wayne State University (WSU) School of Medicine, with its dual orientation in research and medical specialization on the one hand and primary care and community medicine on the other hand, was chosen to represent the middle stream of medical education in the United States. It was established in 1868 and is one of the largest medical schools in the United States, with an enrollment of more than 1,000 students. In its admission policies, the school stressed students' scientific preparation; the faculty recommended courses in psychology and social sciences, but none was required. In addition to the traditional clinical departments, the school had a department of community medicine and a department of family medicine. These departments were responsible for a series of courses that students must take during the first two years of the medical school curriculum. During the clinical years, a four-week clerkship was required in family medicine, in which students had an opportunity to work with family practitioners or other primary care physicians.

Michigan State University (MSU) College of Human Medicine was chosen to represent a new type of medical school, one oriented to the training of primary care physicians and characterized by an educative approach emphasizing the teaching of patient-centered care. The school was founded in 1968, is located in a rural area, and is the smallest of the three schools surveyed, with a total enrollment of approximately 450 students.

Among the school's requirements for admission were nine undergraduate college credits in sociology and/or psychology, in addition to courses in the natural sciences and humanities. This psychosocial orientation was further reflected in the departmental structure of the school and in its curriculum. Along with the departments commonly found in medical schools, the MSU medical school had departments in sociology, psychology, anthropology, family medicine, community health sciences, and medical humanities. In the preclinical years, an important part of the curriculum was reserved for courses in the social and behavioral sciences. In the clinical years, students did their clerkships not in university or metropolitan hospitals but in the community hospital of one of five small or medium-sized cities. Students were generally assigned for the entire period of their clinical training to the same community hospital.

The survey was conducted in the winter semester of 1979 through the use of a self-administered mail questionnaire. Within each school, the questionnaire was sent to a sample of first-year students (freshman group), third-year students (junior group), and students who had completed their studies leading to the M.D. degree in the previous six months (graduate group). The students were chosen according to probability stratified sampling, using the students' school, academic class, sex, and race (white or nonwhite) as stratifying variables. This was done to ensure that the sample would include a sufficient number of female and nonwhite students and students from MSU medical school to permit reliable statistical analyses of these variables. Equal numbers were sought in each category of variables. Overall, 713 medical students were selected from a population of 1,774 individuals. Of this number, 29.5 percent were

from UM medical school, 35.3 percent were from WSU medical school, and 35.2 percent were from MSU medical school. There were approximately equal numbers of freshmen, juniors, and graduates. Finally, 46.6 percent of the students were female, and 29.5 percent were nonwhite.

Of the 713 students selected, 586 returned their questionnaires, for an overall response rate of 82.2 percent. Of these, 567 provided complete data. There were no differences in the response rates among students of the three schools or between male and female students. However, a lower response rate was obtained for nonwhite students (68.4 percent) and for graduates, especially UM graduates (69.0 percent). Lack of time and motivation is perhaps the reason for a low response rate among graduates, who, in contrast to less advanced students, have to assume night studies regularly in addition to the day's work. The reason for race differences in the response rate could not be determined. Overall, the response rate within each sample cell was within the range of the rates usually documented for mail surveys.

The questionnaire was designed to measure the following variables: (a) sociodemographic characteristics (sex, age, race, religion, hometown size, presence of physician in the family, and parents' socioeconomic status); (b) premedical education and interests in the natural, social, and behavioral sciences; (c) attitudes toward professional issues (for example, physician's role in prevention) and sociopolitical issues (for example, national health insurance); (d) expected specialty choice; and (e) perception of values emphasized in the medical school. The last variable was the focus of the present paper.

The students' perceptions of values emphasized in the medical school environ-

ment were measured by a series of items that were inspired in some ways by the work of other researchers (13, 14) but that focused more specifically on values related to the school's scientific and humanistic orientation. In this paper, data are reported pertaining to students' perceptions of values emphasized overall in the medical school. The students were asked to indicate on a scale from 1 to 6 (where 1 means completely absent and 6 means strongly emphasized) how they would rate their medical school on six dimensions: (a) biomedical research, (b) rare diseases, (c) scientific approach, (d) "humanized" or patient-oriented patient care, (e) patient education, and (f) psychosocial orientation. The first three dimensions measured the school's scientific orientation, and the last three dimensions measured the school's humanistic orientation. When the questionnaire was shown to a sample of students prior to use with the sample reported here, the students had little difficulty understanding the dimensions given.

Analysis of variance was used to test for significant score differences among students of the three schools and among students at the three different levels of medical training. An analysis of covariance was performed to study the influence of the students' personal characteristics on their perceptions of what was emphasized in their medical school environment. The students' characteristics studied included a number of sociodemographic characteristics, premedical education and interests, expected specialty choice, and general political orientation. Prior to analysis, data were transformed into scores ranging from -3.0 to +3.0. As the sample was stratified, some groups of students (such as the female and nonwhite students) were over-represented. A weighting procedure, therefore, was used

to make the overall sample representative of the student populations of the three schools.

Results

Table 1 presents the students' mean ratings, by medical school, of the importance given to scientific and humanistic values in the school learning environment. Results of these analyses indicated important differences in the students' perceptions of the emphasis given to scientific and humanistic values in their medical schools. All differences were significant at the .0001 level.

The UM medical students perceived their school as giving more importance to scientific values than to humanistic ones. In contrast, the medical students trained at MSU perceived their school as giving more importance to humanistic values than to scientific values. WSU medical students gave their school intermediate scores for the scientific and humanistic values.

Table 2 presents, by medical school and level of training, the students' mean rat-

ings of the importance given to scientific values in their learning environment. Except for one instance (rare diseases at WSU medical school), the results of these analyses indicated that students at different levels of medical training did not differ significantly in their perceptions of the importance given to scientific values in medical education. In other words, the emphasis given in each school to biomedical research, rare diseases, and scientific values was perceived similarly whether the rating was done by preclinical or clinical students.

Table 3 shows the students' perceptions of their schools' humanistic values, with the results presented also by school and level of medical training. The results for the UM medical school and the WSU medical school revealed significant differences in the perceptions of preclinical and clinical students. Indeed, clinical students tended to perceive less emphasis on humanistic values than preclinical students. These differences in students' perceptions were observed for each of the three dimensions of humanistic values. There

TABLE 1
Mean Ratings of 567 Medical Students at Three Medical Schools of the Perceived Importance Given to Scientific and Humanistic Values by Their Schools, 1979*

Values	Students' Ratings†			F test
	School A (n = 164)	School B (n = 200)	School C (n = 203)	
Scientific values				
Biomedical research	.73	-.30	-.92	270.6‡
Rare diseases	.61	-.23	-.88	170.2‡
Scientific approach	.42	-.21	-.49	60.4‡
Humanistic values				
'Humanized' patient care	-.63	.09	1.02	224.4‡
Patient education	-.43	-.11	1.10	171.7‡
Psychosocial orientation	-.42	-.07	1.03	144.6‡

* School A = University of Michigan Medical School, Ann Arbor, Michigan; School B = Wayne State University School of Medicine, Detroit, Michigan; School C = Michigan State University College of Human Medicine, East Lansing, Michigan.

† Expressed as standardized scores ranging from -3.0 to +3.0.

‡ $P < .0001$.

TABLE 2

Mean Ratings of 567 Students at Three Medical Schools of the Perceived Importance Given to Selected Scientific Values by Their Schools, by School and Students' Level of Training, 1979*

Scientific Values	Students' Ratings†			F test
	Freshmen	Juniors	Graduates	
Biomedical research				
School A	.68	.73	.77	0.28
School B	-.37	-.23	-.31	0.79
School C	-.84	-.96	-.97	0.72
Rare diseases				
School A	.55	.67	.60	0.46
School B	-.54	.03	-.21	11.27‡
School C	-.84	-.89	-.92	0.19
Scientific approach				
School A	.38	.44	.45	0.17
School B	-.21	-.18	-.25	0.17
School C	-.31	-.60	-.62	2.24

* School A = University of Michigan Medical School, Ann Arbor, Michigan; School B = Wayne State University School of Medicine, Detroit, Michigan; School C = Michigan State University College of Human Medicine, East Lansing, Michigan.

† Expressed as standardized scores ranging from -3.0 to +3.0.

‡ $p < .001$.

TABLE 3

Mean Ratings of 567 Students at Three Medical Schools of the Perceived Importance Given to Selected Humanistic Values by Their Schools, by School and Students' Level of Training, 1979*

Humanistic Values	Students' Ratings†			F test
	Freshmen	Juniors	Graduates	
'Humanized' patient care				
School A	-.31	-.81	-.76	8.18‡
School B	.37	.15	-.28	17.59‡
School C	.99	1.01	1.06	0.69
Patient education				
School A	1.14	-.59	-.57	6.48§
School B	.05	.01	-.37	6.46§
School C	1.19	1.01	1.07	0.10
Psychosocial orientation				
School A	.05	-.75	-.58	17.27‡
School B	.20	-.15	-.26	7.43‡
School C	1.05	.98	1.07	0.60

* School A = University of Michigan Medical School, Ann Arbor, Michigan; School B = Wayne State University School of Medicine, Detroit, Michigan; School C = Michigan State University College of Human Medicine, East Lansing, Michigan.

† Expressed as standardized scores ranging from -3.0 to +3.0.

‡ $p < .001$.

§ $p < .005$.

were no such differences at MSU, where perceptions of the importance attached to humanistic values were similar whether the rating was done by preclinical or clinical students.

Finally, the extent to which the students' personal characteristics influenced their perceptions of what was emphasized in medical school was studied. The results of these analyses indicated that the student's medical school and level of training accounted for approximately 40 to 50 percent of the variance in the student's perceptions of school values (one exception being "scientific approach," where less variance was accounted for), whereas students' personal characteristics explained very little additional variance. In other words, perception of school values was not influenced by the personal characteristics of the student doing the rating.

Discussion

Very few people will contend that medicine is not both an art and a science. Yet medical educators will attest that to achieve the proper balance between these two components is difficult.

In the study described here, the authors assessed students' perceptions of the emphasis given to scientific and humanistic values in their learning environment. The results indicate there is a wide school variation in the weight attached to these values in medical education. Therefore, although theoretically both the scientific aspects of disease and the humanistic aspects of patient care are equally valued, the expression of these values in the medical school learning environment varies considerably from one school to another.

In two of the three schools surveyed, the results also point to a weakening of the humanistic values during the crucial clinical years, when professional values are being shaped and internalized. Similar

results were obtained on other items in the comprehensive survey conducted in 1979 by the authors. These items measured the students' perceptions of the values of medical faculty members with regard to the human, social, and educative aspects of patient care, and were reported by the authors at the 1985 Annual Conference on Research in Medical Education. However, clinical students gave significantly lower ratings to their faculty instructors than did preclinical students, not only at the UM and WSU but also at MSU. This suggests that the values put forward by the school can sometimes be different from the values put forward by clinical teachers.

The study indicates that students' perceptions of values emphasized in the medical school environment varied little according to the personal characteristics of the students. Whatever their sociodemographic characteristics, premedical education and interests, expected specialty choice, and political orientation, medical students from the same schools and levels of training perceived school values in very similar ways. These results contribute to the stability and validity of students' perceptions in assessing the medical school environment.

Changes may have occurred since the study was conducted in 1979. Recent data on medical education in the United States and Canada reveal a concern on the part of medical educators with achieving a better equilibrium between the biomedical aspects of disease and the human, social, educative, and ethical aspects of patient care (15). For instance, medical schools have, to varying degrees, modified their curricula for the preclinical years by introducing courses in the social and behavioral sciences and by using a problem-oriented approach to medical education in order to enhance students' perceptions

of care that is patient-oriented rather than disease-oriented. In the clinical years at some schools, besides the traditional clerkships in medicine, surgery, pediatrics, obstetrics/gynecology, and psychiatry, students are now required to take clerkships in family medicine (56 schools), community medicine (20 schools), and/or primary care (21 schools) (16).

However, national data on the 1983 graduates of U.S. medical schools indicate that efforts made by medical schools in this regard are still insufficient (16). Between 35 and 60 percent of the 1983 graduates believed there was not enough time set aside in the curriculum for the management of patients' socioeconomic, educational, and emotional problems, patient follow-up, care of ambulatory patients, care of the elderly, preventive care, and community medicine (16).

Studying the values emphasized in medical schools can be helpful in many ways. It can give faculty members important information about how students see the school. It can provide a tool to assess curricular and organizational change. It can also assist potential students in medical school selection. As for the relationship between the students' perceptions of their learning environment and what they learn, this has not been empirically tested in medical education. However, Haertel and colleagues (17) have documented the existence of such a relationship at the elementary and high school levels.

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DATAGRAM

Residency and Career Plans and Indebtedness Of 1985 Medical School Graduates

Each year the Association of American Medical Colleges surveys senior medical students regarding their medical school experiences and career plans. The data reported here were obtained from 11,048 final-year students, about 66 percent of the 1985 graduating class. (Tables accompanying this datagram appear on the following three pages.)

Residency Plans

About 96 percent of the students responding to the survey planned at least one year of residency. Thirty-six percent of those planning a residency expected it to be three years in length; another 49 percent expected to spend four or five years in their residencies.

Internal medicine and family practice were the most frequently chosen areas for both the residency and the specialty in which certification would be sought. These two areas have been students' first choices for the past several years. Table 1 shows specialty certification plans by residency program choices for all respondents who indicated specialty and residency preferences. Seventy-four percent of the respondents indicated that they had decided on a specialty. This figure has remained relatively stable in recent years.

Postresidency Career Plans

Clinical practice was the first choice of career activity of 70 percent of the students respond-

ing to the survey, with 58 percent choosing private clinical practice and 12 percent salaried clinical practice. Twenty-eight percent planned full-time academic careers, and less than 1 percent planned careers in administration or as salaried research scientists. Table 2 shows the students' first choices of career plans by their preferred specialties.

The practice setting most preferred by 1985 graduates was a medium-size city (population 50,000 to 500,000), chosen by 29 percent of the respondents. Rural areas were the least preferred settings, selected by less than 1 percent of the respondents. Sixteen percent indicated that they plan to locate in socioeconomically deprived areas. Table 3 shows the students' first choices of practice settings by their preferred specialties.

Indebtedness

Eighty-five percent of the 1985 respondents had some educational debt upon graduation from medical school. The 1984 figure was 88 percent. The mean amount of indebtedness for those reporting debt was \$29,942, up from \$26,496 for the class of 1984. This represents a 13 percent increase.

THOMAS H. DIAL, *staff associate, Division of Operational Studies, Association of American Medical Colleges, Washington, D.C.*

TABLE 1
Percentage of Responding 1985 Medical School Graduates Indicating a Preference for Each of 21 Specialty Categories, by Preferred Residency Program*

Specialty	Residency Program										Overall Row Percentage
	Anesthesiology	Emergency Medicine	Family Practice	Internal Medicine	Obstetrics/Gynecology	Orthopedics/Surgery	Pediatrics	Psychiatry	Radiology	General Surgery	
Anesthesiology	98.2	.9	.2	.8	.0	.0	.4	.0	.0	.6	4.1
Dermatology	.0	.0	.2	2.5	.0	.0	.7	.0	.0	.0	1.2
Emergency medicine	.0	95.3	.2	.6	.0	.0	.0	.0	.0	.2	2.6
Family practice	.0	2.8	98.7	.0	.0	.0	.0	.0	.0	.0	14.6
General internal medicine	.3	.9	.1	43.6	.0	.0	.0	.0	.0	.0	11.8
Internal medicine subspecialties	.0	.0	.2	44.0	.2	.2	.6	.2	.0	.2	11.9
Neurology	.0	.0	.0	1.7	.0	.0	2.3	.0	.0	.0	1.7
General obstetrics/gynecology	.0	.0	.1	.1	76.6	.0	.0	.0	.0	.0	5.9
Obstetrics/gynecology subspecialties	.0	.0	.0	.0	23.1	.0	.1	.0	.0	.1	1.8
Ophthalmology	.0	.0	.1	1.9	.0	.2	.5	.0	.0	.4	1.7
Pathology	.0	.0	.1	.2	.0	.0	.1	.0	.0	.0	1.8
General pediatrics	.0	.0	.0	.1	.0	.0	67.1	.0	.0	.0	6.4
Pediatrics subspecialties	.0	.0	.0	.4	.0	.0	25.8	.0	.0	.1	2.6
Psychiatry	.0	.0	.1	.6	.0	.0	.2	99.3	.0	.0	5.3
Radiology	.0	.0	.1	1.7	.0	.0	.5	.2	100.0	.0	4.1
General surgery	.0	.0	.0	.1	.0	.0	.0	.0	.0	58.5	7.0
Orthopedic surgery	.0	.0	.0	.0	.0	99.3	.0	.0	.0	4.2	5.8
Other surgery	.0	.0	.0	.1	.2	.2	.0	.0	.0	28.8	4.2
Otolaryngology	.0	.0	.0	.0	.0	.0	.0	.0	.0	3.7	2.1
Urology	.3	.0	.0	.0	.0	.0	.0	.0	.0	2.5	2.1
Other	1.2	.0	.2	1.5	.0	.0	1.6	.2	.0	.3	1.5
Overall column percentage	3.8	2.5	14.7	26.8	7.7	5.3	9.5	5.1	3.5	11.8	100.0

* Percentages in the body of the table are based on the number of students indicating a preference for the particular residency program and specialty. Columns total 100 percent. Overall column percentages and overall row percentages are based on total number of responding students (8,612). Percentages may not add to 100 because of rounding.

TABLE 2
Percentage of Responding 1985 Medical School Graduates Indicating a Preference for Each of 10 Career Categories, by Preferred Specialty*

Specialty	Teaching		Private Clinical Practice			Salaried Clinical Practice			Other	Overall Row Percentage	
	Basic Science	Clinical Science	Alone	With One Other	Group 3 or More	Undecided Number	Hospital	Group Clinic			State-Federal Agency
Anesthesiology	1.0	24.1	1.0	3.4	49.0	7.0	9.7	.9	2.4	1.5	5.7
Dermatology	1.2	28.7	11.4	19.8	19.2	12.6	2.4	3.0	1.8	.0	1.6
Emergency medicine	.3	18.0	.7	1.0	24.6	3.8	43.3	2.8	2.4	3.1	2.8
Family practice	.0	2.4	5.6	18.6	49.4	12.2	1.2	3.7	4.4	2.5	13.4
General internal medicine	.5	21.6	2.7	7.7	38.3	12.7	3.9	7.5	3.3	1.8	10.7
Internal medicine subspecialties	1.2	49.8	1.0	6.3	23.7	9.6	4.7	.8	1.6	1.2	10.6
Neurology	4.1	56.6	2.6	4.1	16.3	7.7	3.6	1.5	1.5	2.0	1.9
General obstetrics/gynecology	.0	12.0	2.2	9.7	58.1	6.4	2.6	4.6	3.5	1.1	5.4
Obstetrics/gynecology subspecialties	.0	51.9	.6	5.6	28.1	5.0	5.0	1.3	1.3	1.3	1.6
Ophthalmology	.6	22.9	9.4	18.5	28.1	15.2	1.1	.6	2.5	1.4	3.6
Pathology	29.6	15.1	1.1	.6	15.1	5.0	27.9	.0	2.8	2.8	1.8
General pediatrics	.5	21.5	2.0	7.1	42.1	10.3	4.6	6.1	3.7	2.0	5.8
Pediatrics subspecialties	1.7	61.4	.9	1.7	14.6	2.6	12.4	.4	1.3	3.0	2.3
Psychiatry	1.7	32.2	10.0	7.5	15.6	16.0	6.4	2.8	4.9	2.8	5.2
Radiology	1.0	27.2	.9	2.9	42.0	5.5	16.1	1.4	1.9	1.2	5.7
General surgery	.8	31.7	4.0	12.4	29.5	11.3	3.2	.5	4.9	1.9	6.2
Orthopedic surgery	.3	24.3	3.1	9.1	44.4	11.4	1.7	.5	4.3	.9	5.7
Other surgery	.3	50.8	3.8	8.9	23.4	6.6	2.8	.0	1.3	2.3	3.9
Otolaryngology	.4	38.0	3.3	11.6	27.3	11.6	.8	.8	5.4	.8	2.4
Urology	.0	29.5	1.5	20.0	30.5	12.5	2.0	1.0	2.5	.5	2.0
Other	.5	29.3	2.2	7.6	24.5	13.0	15.2	1.1	3.8	2.7	1.8
Overall column percentage	1.2	27.1	3.4	9.3	35.1	10.1	6.3	2.6	3.2	1.8	100.0

* Percentages in the body of the table are based on the number of students indicating a preference for the particular career category and specialty. Rows total 100 percent. Overall column percentages and overall row percentages are based on total number of responding students (10,194). Percentages may not add to 100 because of rounding.

TABLE 3
Percentage of Responding 1965 Medical School Graduates Indicating a Preference for Each of Nine Practice Setting Categories, by Preferred Specialty*

Specialty	Practice Setting Category†									Overall Row Percentage
	Large City	Suburb Large City	Midsize City	Suburb Mid City	Small City	Town	Small Town	Rural	Undecided or No Preference	
Anesthesiology	24.4	14.0	38.7	7.7	7.7	1.4	.2	.2	6.0	5.8
Dermatology	26.8	19.6	23.2	11.3	10.7	.6	.0	.6	7.1	1.6
Emergency medicine	19.9	13.0	35.3	8.9	11.0	2.4	.3	1.0	8.2	2.9
Family practice	3.5	5.4	10.6	9.8	31.4	22.8	6.8	3.4	6.3	13.4
General internal medicine	19.3	12.3	30.2	6.8	15.0	5.4	.5	1.0	9.4	10.8
Internal medicine subspecialties	33.1	15.4	30.9	5.2	5.4	.9	.0	.2	8.9	10.6
Neurology	37.1	14.2	36.0	4.1	3.0	.5	.0	.0	5.1	1.9
General obstetrics/gynecology	19.7	15.5	34.2	8.4	12.6	2.4	.0	.5	6.6	5.4
Obstetrics/gynecology subspecialties	35.4	18.6	30.4	5.0	4.3	.6	.0	.0	5.6	1.6
Ophthalmology	21.7	21.4	30.5	13.2	9.1	.5	.0	.0	3.6	3.6
Pathology	33.1	9.6	35.4	4.5	9.0	1.7	.6	.0	6.2	1.7
General pediatrics	16.6	14.9	28.1	7.6	12.5	5.8	.8	.5	13.2	5.8
Pediatrics subspecialties	35.6	11.6	36.5	3.4	5.6	1.3	.0	.4	5.6	2.3
Psychiatry	31.8	14.9	30.2	5.3	9.6	1.7	.0	.0	6.4	5.2
Radiology	26.9	20.8	31.5	9.0	7.1	.7	.0	.2	4.0	5.7
General surgery	23.2	10.2	31.2	6.7	15.4	4.0	.5	.5	8.4	6.2
Orthopedic surgery	17.2	19.5	32.9	11.2	11.6	.9	.2	.2	6.4	5.7
Other surgery	38.8	16.1	29.3	5.1	3.6	.5	.0	.0	6.6	3.8
Otolaryngology	20.3	20.3	39.4	7.1	7.1	.0	.0	.4	5.4	2.4
Urology	20.0	18.0	39.0	8.5	9.0	.5	.0	.0	5.0	2.0
Other	20.3	15.4	40.7	7.7	7.1	.0	.5	.0	8.2	1.8
Overall column percentage	22.3	14.1	29.5	7.7	12.6	4.9	1.1	.8	7.2	100.0

* Percentages in the body of the table are based on the number of students indicating a preference for the particular practice setting category and specialty. Rows total 100 percent. Overall column percentages and overall row percentages are based on total number of responding students (10,188). Percentages may not add to 100 because of rounding.

† Large city = 500,000 or more; midsize city = 50,000-500,000; small city = 10,000-50,000; town = 2,500-10,000; small town = less than 2,500.

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